BlueWave® LED Flood System User Guide

Large-Area LED Light Source

- Instructions for Safe Use
- Setup and Operation
- Maintenance
- Ordering Spare Parts and Accessories

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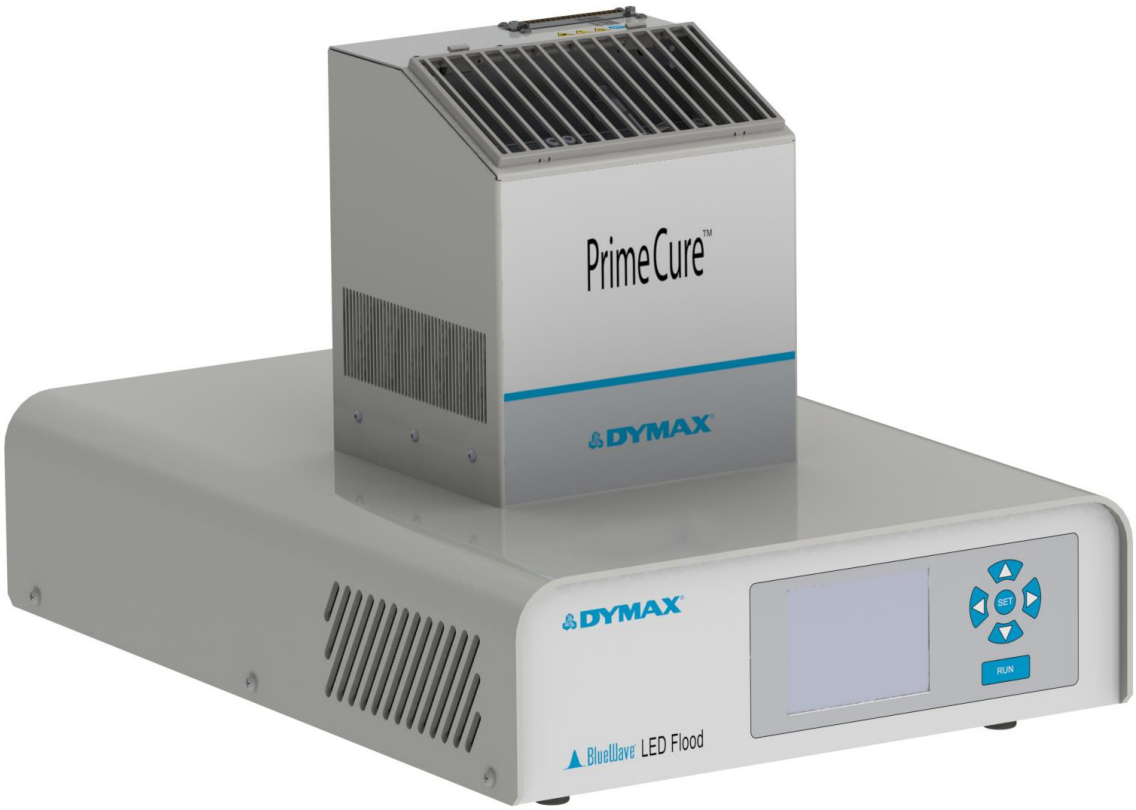

DYMAX®

About Dymax

UV/Visible light-curable adhesives. Systems for light curing, fluid dispensing, and fluid packaging.

Dymax manufactures industrial adhesives, light-curable adhesives, epoxy resins, and activator-cured adhesives. We also manufacture a complete line of manual fluid dispensing systems, automatic fluid dispensing systems, and light-curing systems. Light-curing systems include LED and conventional broad-spectrum light sources, spot, flood, and conveyor systems designed for compatibility and high performance with Dymax adhesives.

Dymax adhesives and light-curing systems optimize the speed of automated assembly, allow for 100% in-line inspection, and increase throughput. System designs enable stand-alone configuration or integration into your existing assembly line.

Please note that most dispensing and curing system applications are unique. Dymax does not warrant the fitness of the product for the intended application. Any warranty applicable to the product, its application, and use is strictly limited to that contained in the Dymax standard Conditions of Sale. Dymax recommends that any intended application be evaluated and tested by the user to ensure that desired performance criteria are satisfied. Dymax is willing to assist users in their performance testing and evaluation by offering equipment trial rental and leasing programs to assist in such testing and evaluations. Data sheets are available for valve controllers or pressure pots upon request.

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Introduction

Introduction to the User Guide

This guide describes how to assemble, use, and maintain the Dymax BlueWave® LED Flood System safely and efficiently.

Intended Audience

Dymax prepared this user guide for experienced process engineers, technicians, and manufacturing personnel. If you are new to high-intensity LED light-curing systems and do not understand the instructions, contact Dymax Application Engineering to answer your questions before using the equipment.

Where to Get Help

Additional resources are available to ensure a trouble-free experience with our products:

- Detailed product information on www.dymax.com
- Customer Support and Application Engineering teams are available by phone and email in the United States, Monday through Friday, from 8:00 a.m. to 5:30 p.m. Eastern Standard Time. You can also email Dymax at info@dymax.com. Please see the back cover for additional Dymax locations.
- Dymax adhesive Product Data Sheets (PDS) on our website
- Material Safety Data Sheets (MSDS) provided with shipments of Dymax adhesives

Safety / Sécurité

WARNING! *If you use this curing system without first reading and understanding the information in this user guide, injury can result from exposure to high-intensity light. To reduce the risk of injury, read and ensure you understand the information in this user guide before assembling and operating a Dymax BlueWave LED Flood System.*

AVERTISSEMENT! *Si vous utilisez le système de séchage sans lire le mode d'emploi et comprendre les informations offertes, des sérieuses blessures peuvent de produire suite à l'exposition à la lumière de haute intensité. Pour réduire les risques de blessures, veuillez lire et comprendre les informations du mode d'emploi avant l'assamblage et l'utilisation du système 'Dymax BlueWave LED Flood'.*

The *BlueWave LED Flood System* is not a stand-alone unit and is intended to be incorporated into a larger system. This integrated system should provide adequate mechanical and electrical safeguards with sufficient light shielding and protection for safe operator use. Final installation must not block vents. To use a *BlueWave LED Flood System* safely, it must be set up and operated in accordance with the instructions given by Dymax. Using the flood system in any other manner will impair the protection of the system. Dymax assumes no liability for any changes that may impair the protection of the curing system.

Le système 'BlueWave LED Flood' n'est pas un système conçu pour l'utilisation simple, mais pour être incorporée dans un plus grand système. Ce système intégré doit offrir des mesures de sécurité adéquate pour

le système mécanique et électrique, obstruer totalement la lumière et protéger l'opérateur pour une utilisation sécuritaire. L'installation finale ne doit pas bloquer les accès pour la ventilation. Pour utiliser en toute sécurité le système 'BlueWave LED Flood', le système doit être installé et utilisé en suivant les instructions offertes par Dymax. L'utilisation du système de toute autre façon peut diminuer sa protection. Dymax n'est pas responsable des changements pouvant diminuer la protection du système de séchage.

General Safety Considerations

All users of Dymax equipment should read and understand this user guide before assembling and using the equipment.

To learn about the safe handling and use of light-curable formulations, obtain and read the MSDS for each product. Dymax includes an MSDS with each adhesive sold. In addition, fluid product MSDS can be requested on the Dymax website.

CAUTION! *Always wear protective goggles or face shield when working near UV light.* ***Never look directly at light!***

WARNING! *Always observe safety requirements! Do not open the cover of the LED Array or Power supply. There are no user serviceable parts inside.*

PRÉCAUTIONS! *Veuillez toujours porter des lunettes protectrices pour les yeux ou pour le visage lors de travail en contact avec la lumière UV. Ne jamais regarder la lumière directement!*

AVERTISSEMENT! *Toujours obéir aux exigences de sécurité ! Ne pas ouvrir les couvercles des lumières LED ou pour l'alimentation électrique. Il n'y a aucune pièce pour l'entretien à l'intérieur.*

Safety Recommendations/Recommander de Sécurité

- Use the goggles provided or an approved face shield for eye/face protection.
- Long-sleeved shirts or a lab coat are recommended for arm protection. The use of opaque gloves will protect the hands.
- Utiliser les lunettes de protection fournies ou une protection pour le visage approuvé pour la protection des yeux et du visage.
- Il est recommandé d'utiliser un chandail avec des longues manches ou un manteau de laboratoire pour la protection des bras. L'utilisation de gants opaques protège les mains.

Specific Safety Considerations

The *BlueWave LED Flood System* is designed to maximize operator safety and minimize exposure to light-curing energy. To use the unit safely, it must be set up and operated in accordance with the instructions in this user guide. Please also read and understand the safety considerations unique to LED-curing systems as described below.

WARNINGS! *Looking directly at the high-intensity light emitted by the BlueWave Large Area LED Array can result in eye injury. To prevent eye injury, never look directly at the high-intensity light and always wear protective goggles (provided).*

AVERTISSEMENT! *Vous pouvez blesser vos yeux si vous regardez directement la lumière de haute intensité émise par le système 'BlueWave LED Flood'. Pour la prévention de blessure aux yeux, veuillez ne jamais regarder directement dans la direction de la lumière de haute intensité et porter des lunettes pour la protection des yeux (fournies).*

Safety Symbol Index

The following symbols are displayed on the curing system. Please see below for their meanings.

Refer to Manual

Eye Protection Required

Warning!

Warning! UV Light Hazard

Electrostatic Sensitive Device

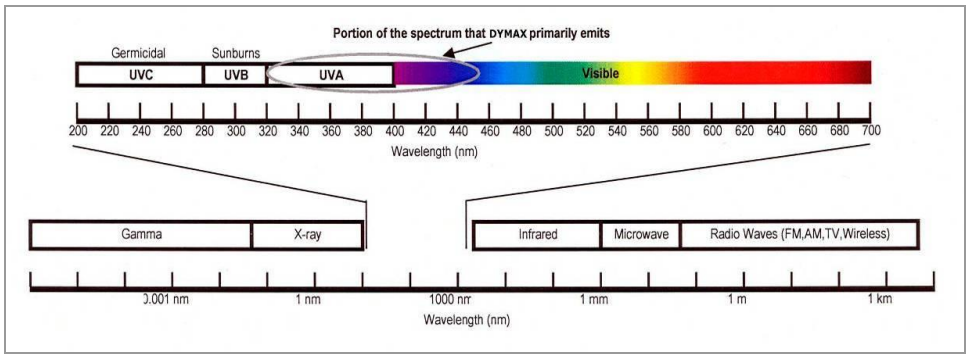
Dymax Light-Curing System Safety Considerations

Operators must understand these three concepts to use the LED light source safely: light exposure, high-temperature surfaces, and bright, visible light. Each is described below.

Light Exposure

The *BlueWave LED Flood System's* PrimeCure™ and RediCure™ models emit energy in the UVA portion of the spectrum while the VisiCure™ model emits energy in the visible portion of the spectrum. UVA light is generally considered the safest of the three UV ranges: UVA, UVB, and UVC. Although OSHA does not currently regulate visible or ultraviolet-light exposure in the workplace, the American Conference of Governmental Industrial Hygienists (ACGIH) does recommend Threshold Limit Values (TLV's) for ultraviolet light. The strictest interpretation of the TLV (over the UVA range) for workers' eyes and skin is 1 mW/cm^2 (intensity), continuous exposure. Unless workers are placing bare hands into the curing area, it is unusual to exceed these limits. To put the 1 mW/cm^2 limit into perspective, cloudless summer days in Connecticut regularly exceed 3 mW/cm^2 of UVA light, which includes the more dangerous UVB light, primarily responsible for suntans, sunburns, and skin cancer.

Figure 1. Light Spectrum



Checking the Workstation

A radiometer should be used to measure stray light to confirm the safety of a light-curing process. A workstation that continuously exposes an operator to more than 1 mW/cm^2 of UVA light should be redesigned.

Protecting Operators

Light-curing technology can be a regulatory compliant, "worker-friendly" manufacturing process when the proper safety equipment and operator training is utilized. There are two ways to protect operators from visible light exposure: shield the operator and/or shield the source.

Shield the Operator

Tinted eyewear will shield the operator from high intensity visible energy, and reduce eye fatigue.

Shield the Source of the Light

The *BlueWave LED Flood System* needs to be used with sufficient light shielding in order to be operated safely. The LED Flood Array and Power Supply are not designed to be used as a stand-alone unit. Any substrate that blocks light can be used as a shield to protect workers from stray light. The following materials can be used to create simple shielding structures:

Sheet Metal – Aluminum, steel, stainless steel, etc. Sheet metal should be coated black or black anodized to minimize reflection of UV and visible light toward operators.

Rigid Plastic Film – Transparent or translucent/light-blocking plastics (typically polycarbonate or acrylic) are commonly used to create shielding where some level of transparency is also desired.

Flexible Film – Translucent light-blocking, flexible urethane films can be used to quickly create workstation shielding. This light-blocking, flexible urethane film is available from Dymax. Call for assistance.

High-Temperature Surfaces

Surfaces exposed to high-intensity curing lights may rise in temperature. The intensity, distance, exposure time, cooling fans, and composition of the surface can all affect the rise in surface temperature. In some cases, exposed surfaces can reach temperatures capable of producing a burn or causing damage to a substrate. In these cases, care must be taken to ensure either a more moderate surface temperature or appropriate protection/training for operators. No infrared radiation is produced by these LED systems, so surface temperatures will be lower than with conventional lamp systems. Empirical testing should be used to verify the exact temperature rise in each application.

Bright, Visible Light

The bright, visible light energy emitted by curing systems can cause eye strain if proper eye protection or shielding is not used. The proper use of tinted eye protection and/or opaque/tinted shielding can be utilized to reduce eye strain and address this concern.

Product Overview

Description of the *BlueWave LED Flood System*

The *BlueWave LED Flood System* is a high-intensity unit used for curing light-curable materials. The unit is designed to be integrated into a larger system, such as an automated manufacturing system, or with a light shielding enclosure to create a bench-top curing station.

The *BlueWave LED Flood System* consists of two main components: an LED flood array and a power supply that contains the user interface. Dymax offers three different wavelength LED flood arrays: VisiCure® (405 nm), PrimeCure™ (385 nm), and RediCure™ (365 nm). Only one LED flood array can be connected to the power supply at a time via the interconnect cable. The power supply is designed to identify the type of LED array that is connected so the power supply can be used with any of the three LED flood arrays.

The unit can be operated in timed or manual modes and features an intensity adjustment, allowing the output intensity level to be adjusted from 5 to 100% to meet process and adhesive requirements. LED technology within the *BlueWave LED Flood System* allows for instant on/off activation without the need for a warm-up period, but is also rated for continuous operation.

Fans in the LED flood power supply and array provide cooling and must not be covered or blocked. Fan Filters must be maintained regularly to ensure reliable operation.

Thermal sensors in the LED flood power supply and array shut the unit down to protect the components if the internal temperature exceeds maximum limits.

WARNING! *If you block the air flow from the LED flood array or the power supply vents, equipment damage and malfunction can result. To prevent damage and malfunction, ensure 1" [2.54 cm] of clearance is provided around the power supply and at least 6" [15.24 cm] of clearance is provided around the cooling fan inlets and outlet to allow the free flow of air.*

AVERTISSEMENT! *Vous pouvez endommager l'équipement ou avoir des difficultés avec l'utilisation si vous bloquez la ventilation pour les lumières LED ou l'alimentation électrique. Pour éviter la détérioration ou le mauvais fonctionnement du système, veuillez vous assurer que l'installation offre un retrait de 1'' [2.54 cm] autour de l'alimentation électrique et au moins 6'' [15.24 cm] de retrait avec la sortie de ventilation et assurez-vous qu'il y a une bonne circulation d'air.*

Special Features and Benefits of the *BlueWave LED Flood System*

The Dymax *BlueWave LED Flood System* is engineered for precise performance and long service life. Key features include:

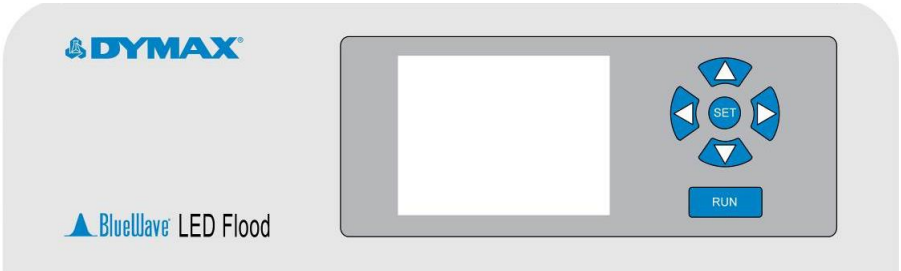
Feature	Benefit
Curing area up to 5" x 5" [12.7 cm x 12.7 cm]	Large-area cure capability with LED
Flexible mounting options	Adaptable to a variety of process and fixture scenarios
100% duty-cycle capability	Highest throughput (exposure cycles “at the speed of light”)
No mechanical shutter	Instant on/Instant off exposures
Intensity output adjustment by keypad or PLC (10 to 100%)	Superior accuracy over “closed loop feedback" or auto-adjusting units
	Optimum process control
Co-optimized to cure with Dymax formulations	Compatibility with many formulations
	Fewer re-qualifications
Stable LED temperature	Optimizes cure time efficiency
	Increases LED life
LED	Superior LED cooling for consistent frequency output
	Longer LED life via reduced intensity degradation

Front Control Panel

The LED flood system has a simple, easy-to-use front interface. The front control panel is located on the right side of the power supply and is used to make all manual adjustments.

- Up Button ( ) - Navigates the selector up one position.
- Down Button ( ) - Navigates the selector down one position.
- Right Button ( ) - Navigates the selector right one position.
- Left Button ( ) - Navigates the selector left one position.
- Set Button (SET) - Located in the center of the arrow buttons. This button selects the option highlighted on the screen
- Run Button (RUN) - This button is used to activate the LED flood array when in manual mode.

Figure 2. Front Control Panel



Back Panel

The back panel includes these components and connection points:

- **Power Cord Receptacle** — Connection point for the power cord.
- **I/O (On/Off) Switch** — Moving the switch to the I (on) position powers up the power supply. Moving the switch to the O (off) position cuts power to the power supply.
- **Cooling Air Exhaust** — Cooling air enters the side vents and exhausts out the rear of the unit.
  NOTE: *The exhaust vents on the rear of the power supply must not be blocked or the unit may overheat and shut down. Ensure 1" [2.54 cm] of clearance is provided around the power supply and at least 6" [15.24 cm] of clearance is provided around the cooling fan inlets and outlet.*
- **Foot-Switch Jack** — Connection point for the foot switch. Pressing the foot switch starts a curing cycle. In timed operation, pressing and releasing the foot switch activates the curing array for the length of time displayed in the cycle time display. A second press will terminate a timed cure cycle immediately. In manual operation, pressing and holding the foot switch activates the curing light until the foot switch is released.
- **PLC Access Switch** – Button used to temporarily unlock the option to access PLC mode.
- **PLC Connector** — Connection point for a user-supplied cable to connect the unit to a PLC for remote operation. Connection is a standard 25-pin D-style connector. Refer to page 19 for details on the connections to this port.
- **Array Cable Connector** — Connection point for the interconnection cable connecting the power supply to the array.

Figure 3. Back Panel

Intensity Control Feature

The components used in all light-curing systems degrade with use. Therefore, the maximum intensity decreases as exposure hours accumulate. Setting process intensity requirements lower than the maximum enables the *BlueWave LED Flood's* intensity control feature to allow for compensation of gradual decreases in light intensity.

The unit's intensity can be adjusted using the intensity adjustment on the front control panel as a percentage of full scale intensity.

Use a radiometer to correlate the power output setting to a reading in W/cm^2. The adjustment of power level and correlation to an intensity value (W/cm^2) enables precise control of light intensity during validation and operation.

Operation Modes

The power supply allows the user to select between manual activation mode, timer mode, or PLC mode. The manual mode allows the user to active the LED array via a foot switch or by pressing the run button. The timer mode allows the user to activate the LED array for a set amount of time. PLC mode allows an external machine to control all functions of the unit.

Validation

Tests should be conducted prior to production to determine the time and light intensity required to fully cure your resin. The following approaches may be used to validate the curing process.

Set Exposure Time, Determine Intensity

Users can specify a cure time and, through empirical testing, determine the intensity required to achieve a full cure. As with any manufacturing process, it is advisable to incorporate a safety factor.

Set Intensity, Determine Exposure Time

Users can specify light intensity and, through empirical testing, determine the exposure time required to achieve a full cure. As with any manufacturing process, it is advisable to incorporate a safety factor.

Control

Process validation confirms a minimum acceptable intensity. Users can then choose to operate at full intensity (using the excess intensity as an additional safety factor) or adjust the output to a specific intensity level. To ensure consistent and repeatable process results, intensity levels should be monitored with a radiometer. This enables users to identify changes in light intensity and take corrective action: either adjusting the light intensity or performing maintenance.

Assembly and Setup

Safety / Sécurité

The *BlueWave LED Flood System* is not a stand-alone unit and is intended to be incorporated into a larger system. This integrated system should provide adequate mechanical and electrical safeguards with sufficient light shielding and protection for safe operator use. Final installation must not block vents. To use a *BlueWave LED Flood System* safely, it must be set up and operated in accordance with the instructions given by Dymax. Using the flood system in any other manner will impair the protection of the system. Dymax assumes no liability for any changes that may impair the protection of the curing system.

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le système mécanique et électrique, obstruer totalement la lumière et protéger l'opérateur pour une utilisation sécuritaire. L'installation finale ne doit pas bloquer les accès pour la ventilation. Pour utiliser en toute sécurité le système 'BlueWave LED Flood', le système doit être installé et utilisé en suivant les instructions offertes par Dymax. L'utilisation du système de toute autre façon peut diminuer sa protection. Dymax n'est pas responsable des changements pouvant diminuer la protection du système de séchage.

Unpacking and Inspecting Your Shipment

When your *BlueWave LED Flood System* arrives, inspect any boxes for damage and notify the shipper of box damage immediately.

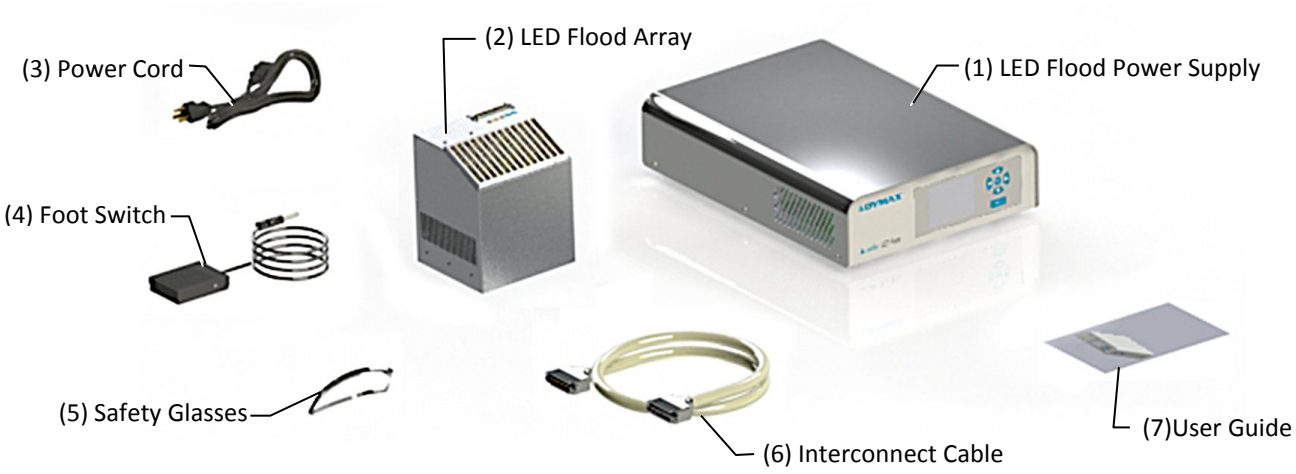
Open each box and check for equipment damage. If parts are damaged, notify the shipper and submit a claim for the damaged parts. Contact Dymax so that new parts can be shipped to you immediately.

Check that the parts included in your order match those listed below. If parts are missing, contact your local Dymax representative or Dymax Customer Support to resolve the problem.

Parts Included in the *BlueWave LED Flood System*

- **LED Flood Power Supply (1)** – PN 41276
- **LED Flood Array (2)** – VisiCure® (PN 41211), PrimeCure™ (PN 41210), or RediCure™ (PN 41212) model
- **Power Cord (3)** – Dependent on model ordered. Available options listed below:
    - Standard North American Power Cord (PN 41274)
    - Type G Power Cord for Asia (PN 41275)
    - No Power Cord (*Note: For European customers, the appropriate power cord will be added*)
- **Foot Switch (4)** – PN 40402
- **Safety Glasses (5)** – PN 35285
- **Interconnect Cable (6)** – PN 41228 – Connects the power supply to the array
- ***BlueWave LED Flood System* User Guide (7)** – PN 41264

Figure 4. *BlueWave LED Flood System* Components



System Connections

WARNING! *Make sure the unit is turned off and unplugged before you make any connections to the back panel. Never attempt to unplug or attach a cable when the unit is turned on.*

AVERTISSEMENT! *Assurez-vous que l'unité est hors tension et débranché avant d'effectuer une connexion sur le panneau électrique (derrière l'unité). Ne jamais débrancher ou attacher un câble lorsque l'unité est alimentée.*

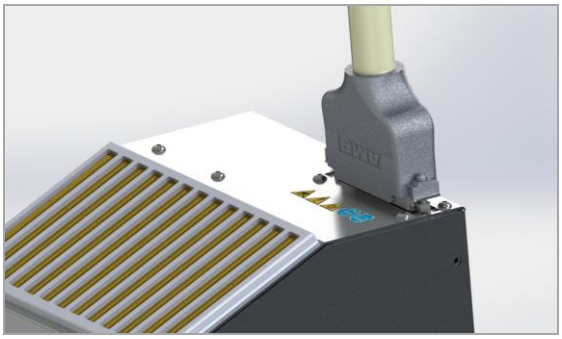
NOTE: *The unit should be positioned so that the back panel of the power supply can easily be accessed should the power need to be disconnected.*

Interconnect Cable

The interconnect cable runs from the back panel of the power supply to the top of the LED flood array.

Figure 5. Connect Interconnect Cable to Power Supply

Figure 6. Connect Opposite End of Interconnect Cable to LED Flood Array



Operating the LED Light

Adjusting Intensity

The output intensity can be adjusted from 5% (depending on the LED Flood configuration ordered) to 100% in 1% increments. To adjust the intensity:

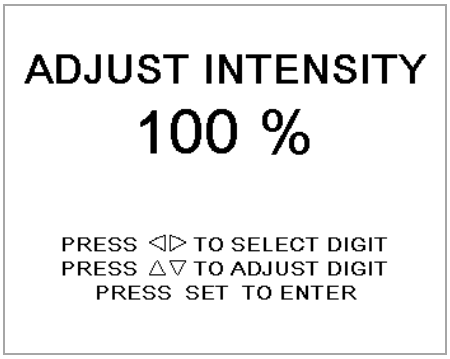
1. From the main screen, press and hold the SET button on the front control panel for several seconds until the Options Menu (Figure 7) appears.
2. Use the ▲ and the ▼ so that the “Adjust Intensity” option is flashing and press the SET button to enter the Adjust Intensity Menu (Figure 8).
3. Use the ▲, ▼, ◀, or ▶ keys to adjust the intensity setting. Press the Set button to enter the value and exit to the main page.

NOTE: *If you enter intensity that is too low for the LED Flood Array attached the unit, the unit will beep for 5 seconds, and the intensity will not change.*

If you are operating in PLC mode, a PLC input signal allows intensity to be selected from this menu or allows intensity to be controlled directly by the PLC.

Figure 7. Options Menu

Figure 8. Adjust Intensity Menu



Operating Modes

There are three basic operating modes: Manual Mode, Timer Mode, and PLC Mode.

Manual Mode: The LED activates whenever the foot switch or the run button on the front panel is pressed. The LED remains active only as long as the foot switch or run button is pressed. When the foot switch and run button are released, the LED shuts off.

NOTE: *PLC outputs are always active in manual and timer mode.*

Timer Mode: The LED is active for a specific time period each time the foot switch or run button is pressed. You must set the specific time by adjusting the timer's value on the screen. Momentarily pressing the foot switch or run button starts the timer and activates the LED. Once the timer counts down to zero, the shutter closes, and the timer resets to the value that you set and is ready for another exposure cycle. The activation can be cancelled at any time during the exposure cycle by pressing the foot switch or run button.

NOTE: *PLC outputs are always active in timer and manual mode.*

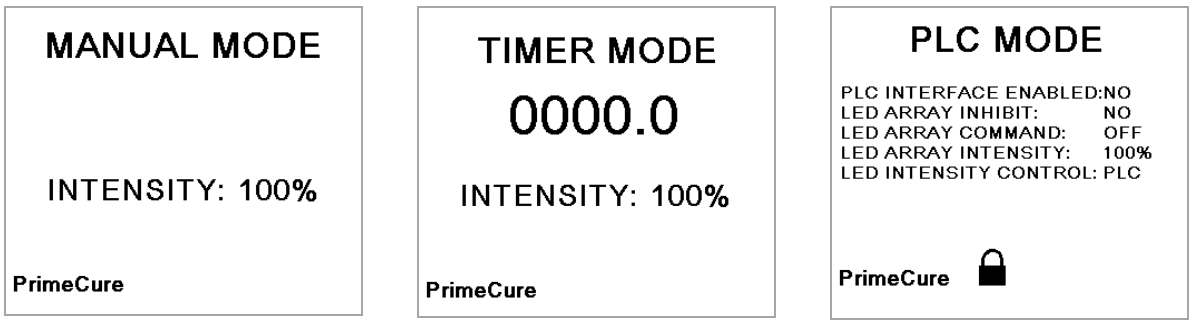
PLC Mode: An external PLC (Programmable Logic Controller) controls the unit. The PLC provides input signals to the *BlueWave LED Flood* to control the LED. The PLC monitors the status of the unit by reading output signals provided by the *BlueWave LED Flood*. The PLC is typically programmed to start other machinery when the unit becomes ready, or perhaps start the unit when other machinery is ready. The input signals and output signals are present through the 25-pin connector on the power supply's back panel marked PLC.

NOTE: *The run button can be used to activate the LED light without PLC commands to assist fixture troubleshooting*.

Choosing an Operating Mode

NOTE: *Upon power-up, your BlueWave LED Flood System will default to its last configuration settings.*

Figure 9. Mode Start-up Screens (Left to Right: Manual Mode, Timer Mode, PLC Mode)



NOTE: *If the BlueWave LED Flood System powers up in PLC Mode, you cannot change any settings via the front panel controls until you press the PLC Access Switch on the back panel.*

To Switch Between Manual and Timer Mode:

1. From the main page, press the SET button to open the Options Menu (Figure 10).
2. Use the ▲ and ▼ buttons, so that the "SELECT MODE" option is flashing and press the SET button to open the Select Mode Menu (Figure 11).
3. Using the ▲ and ▼ buttons, highlight the desired mode and press the SET button.
4. The mode has now been set and the screen should return to the main page.

Figure 10. Options Menu

Figure 11. Select Mode Menu

Selecting the PLC Mode from the Timer or Manual Mode:

1. Press the PLC Access Switch on the back of the unit (Figure 12).
2. From the main page, press the SET button to open the Options Menu (Figure 13) within 30 seconds.

Figure 12. PLC Access Switch

Figure 13. Options Menu

3. Use the ▲ and ▼ buttons, so that the "SELECT MODE" option is flashing and press the SET button to open the Select Mode Menu (Figure 14).
4. Using the ▲ and ▼ buttons, highlight "PLC MODE" and press SET the button.

   NOTE: *If you do not see "PLC Mode", then select "CANCEL" using the ▲ and ▼ buttons and press the SET button. Then follow the instructions starting at step 1.*

5. PLC Mode selection is successful if the screen below appears.

Figure 14. Select Mode Menu

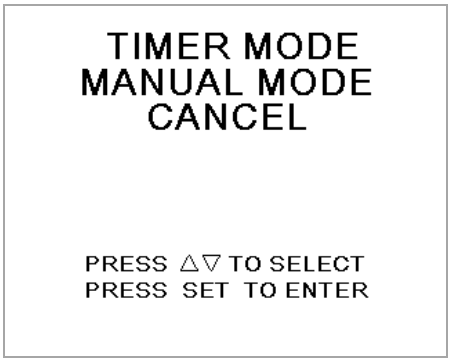
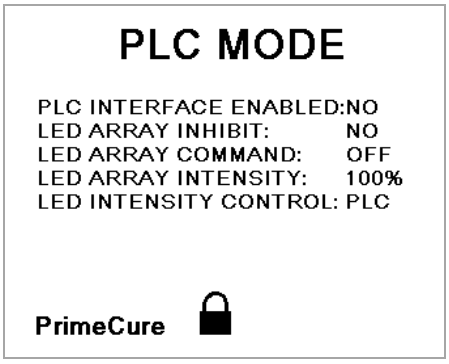


Figure 15. PLC Mode Menu



Selecting Timer or Manual Modes from the PLC Mode:

1. Press the PLC Access Switch on the back of the unit (Figure 16).
   NOTE: *The padlock will disappear from the PLC Mode screen after you press the PLC Access Switch.*

2. Press the SET button. The Options Menu should appear (Figure 17).
   NOTE: *If the screens do not change after you press the SET button, then go back to step 1.*

Figure 16. PLC Access Switch

Figure 17. Options Menu

3. Use the ▲ and ▼ buttons, so that the “SELECT MODE” option is flashing and press the SET button to open the Select Mode Menu (Figure 18).

4. Using the ▲ and ▼ buttons, highlight “TIMER MODE” or “MANUAL MODE” and press the SET button.

Figure 18. Select Mode Menu

Operating in Manual Mode

Manual Mode Description

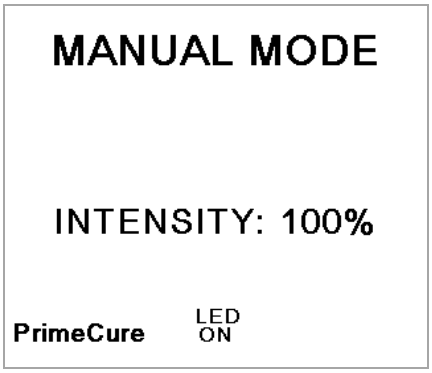
Manual Mode means that the LED activates whenever the foot switch or the run button on the front panel is pressed. The LED remains active only as long as the foot switch or run button is pressed. When the foot pedal and run button are released, the LED shuts off.

Procedure

1. Ensure the *BlueWave LED Flood* is in Manual Mode (Figure 19). If the system is not in Manual Mode, follow the instructions in "Choosing an Operating Mode".
2. Verify that the LED Head is connected properly to the Power supply via the Interconnect Cable.
3. Press and hold the Footswitch or the RUN Button on the front panel to activate the LED.
4. To stop exposure, release the Footswitch or the RUN Button on the front panel.

***NOTE:** The "LED ON" text will only appear when the footswitch or run button is pressed.*

Figure 19. Manual Mode - Activated Screen



Operating in Timer Mode

Timer Mode Description

Timer Mode means that the LED is active for a specific time period each time the foot switch or run button is pressed. You must set the specific time by adjusting the timer's value on the screen. Momentarily pressing the foot switch or run button starts the timer and activates the LED. When the timer counts down to zero, the shutter closes, and the timer resets to the value that you set and is ready for another exposure cycle. The activation can be cancelled at any time during the exposure cycle by pressing the foot switch or run button.

NOTE: A timed exposure can be interrupted with the foot switch or the RUN button on the front panel.

Adjusting the Timer

1. Ensure the *BlueWave LED Flood* is in Timer Mode (Figure 20). If the *BlueWave LED Flood* is not in Timer Mode, follow the instructions in "Choosing an Operating Mode".
2. If the time on the screen is correct, skip to Step 6. Otherwise you need to adjust the Timer to the correct value by following the next steps.

3. Press and release the SET Button to enter the Options Menu (Figure 21).

4. Use ▲ or ▼ Arrows so that “ADJUST TIMER” is flashing and press the SET Button.

5. The Adjust Timer Screen (Figure 22) will display. Use the Directional Keys to adjust the Timer to the correct value. The Timer can be adjusted from 0000.0 seconds to 9999.9 seconds. Press and release the SET Button when you have entered the desired activation time.

Figure 20. Time Mode Main Screen

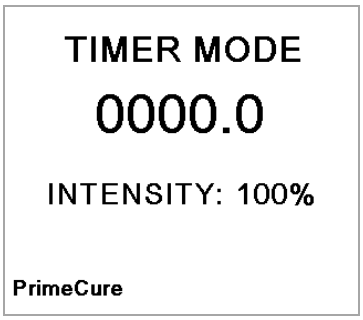


Figure 21. Options Menu

Figure 22. Adjust Timer Screen

6. Press the Foot Switch or the RUN Button on the front panel to start the Timer. An exposure cycle can be cancelled at any time by momentarily pressing the RUN Button or Foot Switch.

Operating in PLC Mode

PLC Mode Description

CAUTION! *Always wear protective goggles or a face shield when working near UV light. The PLC is capable of turning on the LED at any time, or when a user selects PLC Mode from the front panel controls.*

PRÉCAUTIONS! *Veuillez toujours porter des lunettes protectrices pour les yeux ou pour le visage lors de travail en contact avec la lumière UV. Le 'PLC' peut mettre sous tension le système DEL en tout temps, ou lorsque l'utilisateur sélectionne le mode 'PLC' avec les commandes du panneau frontal.*

PLC Mode means that an external PLC (Programmable Logic Controller) controls the system. The PLC provides input signals to the flood unit to control the LED. The PLC monitors the status of the flood unit by reading output signals provided by the unit. The PLC is typically programmed to start other machinery when the flood unit becomes ready, or perhaps start the flood unit when other machinery is ready. The input signals and output signals are present on a connector on the back of the power supply labeled ‘PLC’.

***NOTE**: Output signals are always provided in manual mode and timer mode to allow simple interfacing to alarms, counters, other interlocks, etc. even if a PLC will not be controlling the unit. However, the input signals will be ignored in manual mode and timer mode.*

Wiring the PLC Interface

The *BlueWave LED Flood* System includes a 25-pin D-subminiature connector (Figure 23) on the rear panel of the power supply for communication with a PLC or similar process control equipment. The connector provides for input and output signals.

Typical connections to a PLC should be made according to Figure 24.

Figure 23. 25-Pin D-Subminiature Connector

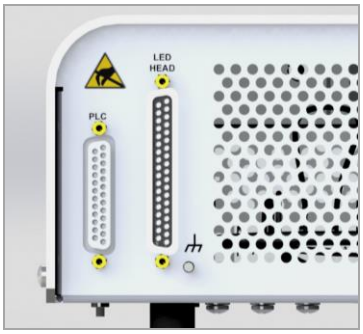
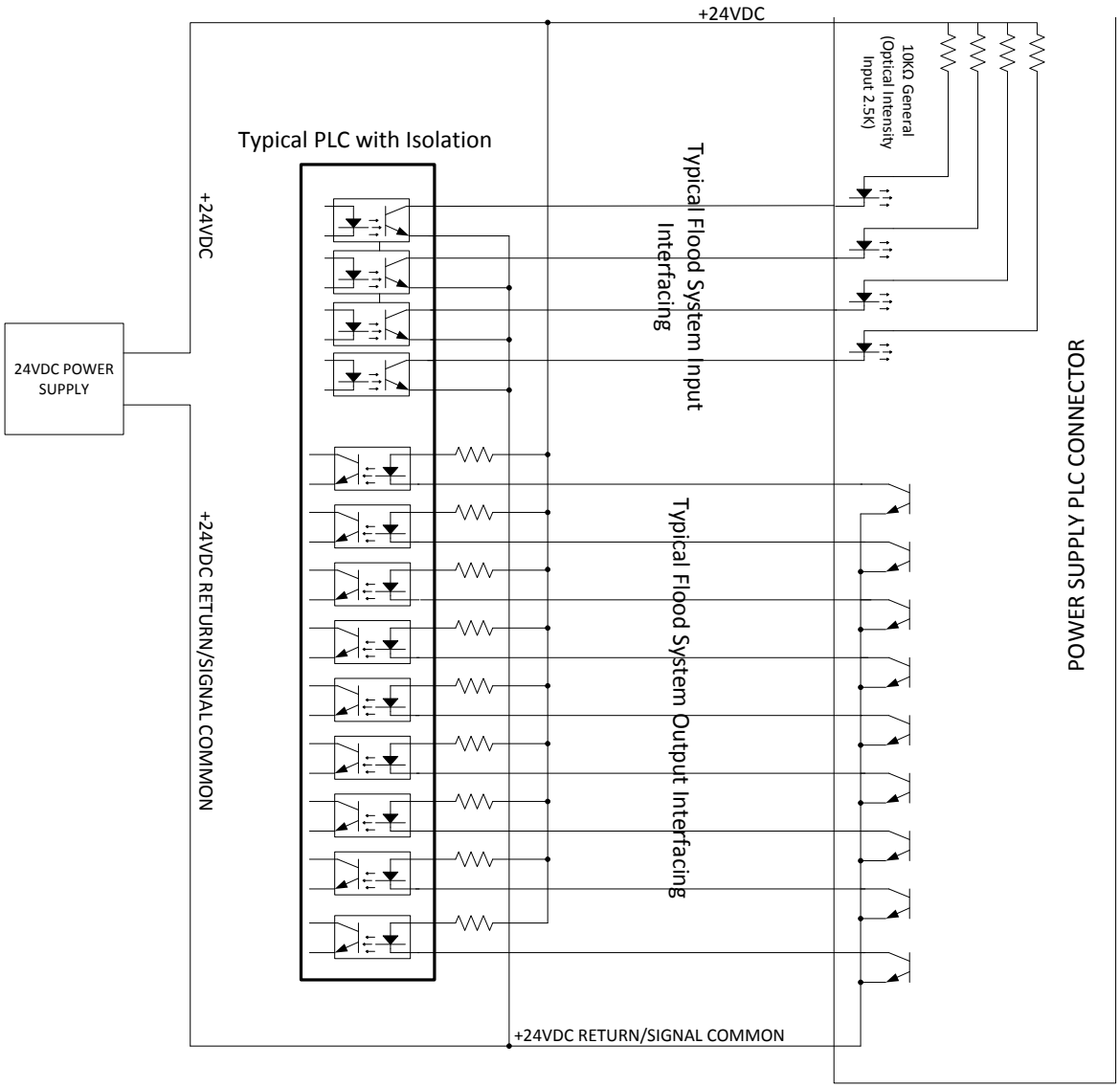


Figure 24. Typical Connections to a PLC



Input Signal Definition

Note: *Asserting an input signal means connecting the input pin to return. Approximately 3mA will flow out of the pin. The current is supplied from the +24VDC Supply. Un-asserting an input signal means that less than 1 microampere of current is drawn from the pin.*

NOTE*: All Input signals are ignored until the Flood Unit is placed in PLC mode.*

Table 1 Input Signals to the Flood Unit on the PLC Interface

Name	Pin Number	Definition and Notes
+24 VDC input	1	Provide +24VDC +/- 10% to this pin
+24 VDC Return/ Signal Common	2	Return for all signals on the on the PLC. This signal is optically isolated from any AC power and Protective Earth.
PLC Interface Enable	3	The PLC should assert this signal after all other signal outputs by the PLC program are valid. The unit will not respond to PLC control if this signal is not asserted
LED Activation Request	4	The PLC should assert this signal to command the LED to turn on.
Inhibit LFA	5	When asserted, this signal will prevent the LED from turning on when the system is in PLC mode, no matter what the state of other PLC input signals are. Also, the LED will not turn on if the front panel Run key is pressed in PLC Mode.
Intensity Selection	6	This signal is used to tell the Flood Unit to set the intensity using the entry in the front key panel or to set intensity using the Intensity Control signal below. When asserted or wired to signal common, the intensity will be controlled by the PLC. If left unconnected, the intensity will be controlled by the entry on the front key panel. *Note- It is more useful to keep this signal disconnected from the PLC and use it as a fixed connection to Signal Common or disconnected from all other signals, depending upon on the desired intensity control method.* *Note- The PLC Screen will always show the current LFA intensity, no matter which method is used to control intensity*.
Intensity Control	20	This signal provides a means for the PLC to directly control LFA intensity. The PLC output must be a contact closure to signal common, switching at 2KHZ, with a duty cycle of 0 to 100%. *Note- Instructing the PLC to leave contact open all of the time is a command to have the LFA operate at 100% of rated intensity*. Note- Instructing the PLC to leave the contact fully closed is a command to have the LFA operate at minimum intensity. The minimum intensity varies with LFA part number

Note- to simplify interfacing and to reduce troubleshooting time, the state of all PLC signals and the Intensity of the LFA are reported on the screen of the LCD.

Output Signal Definition

NOTE: *Output signals which are asserted can sink up to 2.5 milliamperes with 5V maximum between signal output pin and +24VDC Return/Signal Common. The current flows through the output signal pin to the +24VDC Return/Signal Common pin. Output signals which are not asserted may draw 5 microamperes of current at 24 VDC +/- 10%.*

Table 2 Outputs Signals from the Flood Unit on the PLC Interface

Name	Pin Number	Definition and Notes
System Health	15	When this signal is asserted, the controller is functioning properly and the PLC outputs are valid. If this signal is not asserted the PLC outputs are not valid.
System Ready for PLC Control	7	When this signal is asserted, the system will respond to PLC Control. The signal will be unasserted if the system is not in PLC Mode, or a user is adjusting a menu while in PLC Mode. When this signal is unasserted, the system will not respond to actions commanded by the PLC.
Thermal Warning	8	When this signal is asserted, the LED array or the power supply is being operated at a temperature in excess of its specification or airflow to the LED array or power supply is restricted. If this signal is not asserted, the flood system is being operated within specifications and airflow is not restricted. Typically this signal is used to shut down an automated process in an orderly fashion so that corrections can be made before the flood system shuts down to overheating.
System Fault	14	When this signal is asserted, the system has detected a fault and will not respond to any PLC commands until an operator corrects the fault.
LFA Activated	16	This signal indicates the state the LED unit. When asserted, the LED is on. When this signal is not asserted, the LFA is off.
LFA ID's	17 (ID4) 18 (ID2) 19 (ID1)	As a group, these three signals indicate the part number of the LED array attached to the power supply When a RediCure™ LED array is connected, LFA ID4 and LFA ID1 are asserted. When a PrimeCure™ LED array is connected, LFA ID4 is asserted. When a VisiCure™ LED array is connected, LFA ID4 and LFA ID2 are asserted. *NOTE: If no array is connected, the unit will report a system fault and LFA ID2 and LFA ID1 are asserted.*
Intensity Status	21	This signal output provides a means for the PLC to monitor intensity. It is a pulse-width modulated contact closure to +24VDC/Signal Common. When the contact is always closed, the LFA is operating at 100% of rated intensity. When the closed 50% of the time, the LFA is operating at 50% of rated intensity. The contact closure frequency (pulse width modulation frequency) is 2.0 KHz.

Troubleshooting the PLC Interface

In PLC Mode, the LCD screen gives the status of all inputs to the Flood Unit.

NOTE: *The LCD screen also indicates the set point intensity emitted by the LED Head, which may be different from the intensity commanded by the PLC if the Intensity Control Method is via the front panel keyboard.*

Testing Fixtures in PLC Mode

When the unit is in PLC Mode and the Inhibit LFA signal is not present, pressing the run button will turn on the LED. This is useful for fixture troubleshooting and process verification

Cleaning & Maintenance

Inspect and Replace Fuses

The LED Flood Power Supply has two Fuse Holders located on the rear panel (Figure 25). Follow these steps to inspect and replace the fuses if indicated as a corrective action based on troubleshooting:

1. Unplug the unit.
2. Remove the Fuse Holders using a screwdriver (Figure 26).
3. Remove and inspect the fuses (Figure 27). Replace blown fuses with new ones as specified in the Specifications section.
4. Place the Fuse Holder back into the rear panel and tighten using a screwdriver. Be careful not to over tighten.

Figure 25. Fuse Holders

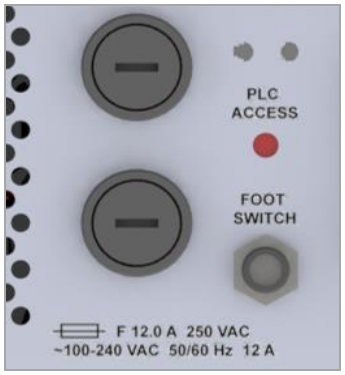


Figure 26. Remove Fuse Holder

Figure 27. Remove Fuse from Holder

Cleaning the Quartz Optic Plate

Based on the cleanliness of your operating environment, establish a schedule for cleaning the LED array optic plate. When cleaning is required, shut the unit down and allow it to cool. Then clean the quartz optic plate surface (Figure 28) with a clean lint-free cloth and isopropyl alcohol.

Figure 28. Quartz Optic Plate

Troubleshooting

The *BlueWave LED Flood System* constantly verifies the performance of the power supply and LED head. If a problem is detected, a diagnostic screen is displayed.

Please take note of the contents of the screen and contact Dymax for support.

Figure 29. Diagnostics Screen

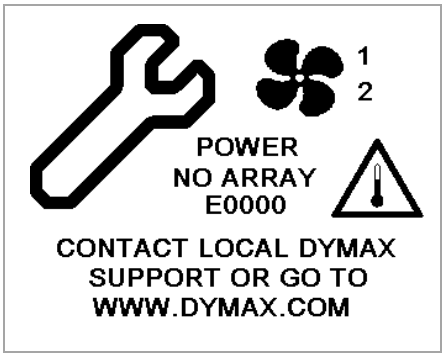


Table 2. Fault Symbols

Error Screen	Name	Description
	Array Thermal Cutoff	The array overheated. Verify the filter on the array is clean and replace if necessary. Verify that the vents on the array are not blocked. Verify the array is drawing room air which is less than 40 °C. Power down and restart the controller to reset. If the problem persists, note the number following the “E” and contact Dymax for further assistance
	Controller Power Supply Failure	There was a failure with the controller. Verify that the filters on the side of the controller are not blocked. Clean the vents with a vacuum if necessary. Do not attempt to open the controller. Power down and restart the controller to reset. If the problem persists, note the number following the “E” and contact Dymax for further assistance
	Array Not Connected, Array Malfunction, or Cable Problem	There was a problem with the connection between the array and the controller or LEDs which have failed. Turn off the controller and very that the cable is firmly attached by screws on the controller and the array. Power down and restart the controller to reset. If the problem persists, note the number following the “E” and contact Dymax for further assistance
	Controller Board Failure	There was a failure with the controller board. Power down and restart the controller to reset. If the problem persists, note the number following the “E” and contact Dymax for further assistance
	Flashing Power Supply Thermal Warning	Indicates that the power supply has exceeded the recommended temperature limit. Check the filters on the controller for any clogs and if necessary, clean the filters. Verify that ambient temperature around the controller is below 40°C. The unit will continue to operate normally unless the temperature in the controller continues to rise.
	Flashing Array Thermal Warning	Indicates that the cooling air drawn into the array is has exceeded the recommended temperature limit of 40 °C. Check the filter on the array for any clogs and if necessary, clean or replace the filter. Operate the unit in an ambient temperature of 40 °C or less. Verify that hot air from other equipment is not being drawn into the array. The unit will continue to operate unless the cooling air temperature continues to rise.

Table 3. Troubleshooting Chart for *BlueWave LED Flood System*

Problem	Possible Cause	Corrective Action
Unit does not power up	The Power Cord is not plugged in or is damaged.	Check the connections and condition of the Power Cord.
	The Onboard Fuse is blown.	Check Onboard Fuse.
	There is no electrical power at the Receptacle.	Test the Receptacle for power.
Unit powers up but LED is not producing light	The LED intensity adjustment is set to the minimum.	Increase the LED intensity setting.
	The Interface Cable connections are loose or damaged.	Check the connections and condition of the Interface Cable.
Unit is operating normally and LED suddenly stops producing light	The over-temperature shutdown was triggered.	Check that the flow of cooling air into the Power supply or LED Flood Array is not restricted. Check that the Filter is clean. If the LED does not illuminate after restarting, contact Dymax Application Engineering.
LED Array provides only low-intensity light	The LED intensity adjustment is set to the minimum.	Increase the LED intensity setting.
	The Lens Optics are contaminated/dirty.	Clean the surface of the Lens.
Foot Switch does not function	The Foot Switch is not connected.	Connect the Foot Switch.
	The Foot Switch is defective.	Activate the unit using the Front Control Panel. Replace the Foot Switch if the unit operates from the Front Control Panel.
Unit appears to run hot	The Cooling Fan Filter is dirty or blocked.	Replace the Cooling Fan Filters. Remove items that are blocking the Filter and Air Inlet.
	There is insufficient clearance around the Power Supply.	Ensure 1" [2.54 cm] of clearance is provided around the Power Supply and at least 6" [15.24 cm] of clearance is provided around the Cooling Fan Inlets.
	The Fan is not operating.	Ensure that the Fan is operating. Contact Dymax Application Engineering.
	The Power Supply is contaminated with dust or debris.	Contact Dymax Application Engineering.
LED or Power warning symbol is flashing in lower right hand corner of screen	The cooling fan filter on the LED head is dirty or blocked. The cooling fan filter on the controller is dirty or blocked. The system is being operated at a room temperature greater than 40°C	Replace the cooling fan filters. Remove items that are blocking the filter and air inlets. Clean the filter on the base with a vacuum, improve airflow around the system.

Spare Parts and Accessories

Spare/Replacement Parts

Item	Part Number
Key System Components	
LED Flood Power supply	41276
PrimeCure™ LED Flood Array – 385 nm Wavelength	41210
VisiCure® LED Flood Array – 405 nm Wavelength	41211
RediCure™ LED Flood Array – 365 nm Wavelength	41212
Quartz Optic Lens	41331
Air Filter Assembly	41330
Fuses: 12 Amp	41271
Foot Switch and AC Power Cords	
Foot Switch	40402
Power Cord, North American	41274
Power Cord, China	41275
Miscellaneous	
Silicone Pad (for bench-top stand base)	41304
User Guide, English	41264

Options/Accessories

Item	Part Number
Personal Protection Equipment	
Protective Goggles — Green (not available in Europe)	35286
Protective Goggles — Gray (standard model included with unit)	35285
Face Shield (not available in Europe)	35186
Radiometers	
Dymax ACCU-CAL™ 50-LED Radiometer (flood)	40519
Stands & Shields	
Standard Bench-Top Stand & Work Platform (bench-top mini-flood mode)	41268
Premium Bench-Top Stand & Work Platform (bench-top mini-flood mode)	41294
Light Shield	41321
Shield	35306
Misc.	
Power Supply to Irradiator Head Interconnect Cable, 115" [292.1 cm]	41228
Retrofit Kit (for use with UVCS Conveyors – not available in Europe)	41340

Specifications

Specifications

Property	Specification		
Part Numbers	VisiCure® 405 nm	**41260**	Power cord NOT included*
		41288	North American power cord with 120V plug
		41291	Asian Power cord
	PrimeCure™ 385 nm	**41261**	Power cord NOT included*
		41287	North American power cord with 120V plug
		41290	Asian Power cord
	RediCure™ 365 nm	**41262**	Power cord NOT included*
		41292	North American power cord with 120V plug
		41289	Asian Power cord
Typical Initial Output Intensities	VisiCure®: 950 mW/cm^2 PrimeCure™: 850 mW/cm^2 RediCure™: 500 mW/cm^2		
Output Frequency	365 nm, 385 nm, or 405 nm		
Power Requirements	100-240 V, 50-60 Hz (auto ranging)		
Fuse	12 amp		
LED Timer	0.1 to 9999.9 seconds		
LED Activation	Foot switch, front panel, or PLC		
Cooling	Forced air, filtered fan		
Hour Meter	Unit operation and exposure (non-resettable)		
Dimensions (W x D x H)	Power Supply : 13.00" x 18.25" x 4.50" [33.0 cm x 46.4 cm x 11.4 cm] Array: 6.50" x 5.75" x 7.50" [16.5 cm x 14.6 cm x 19.1 cm]		
Interconnect Cable Length	115" [292.1 cm]		
I/O Port	25-Pin D-Sub		
Weight	Power Supply: 15 lbs [6.8 kg] Array: 8 lbs [3.6 kg]		
Unit Warranty	1 year from purchase date		
Operating Environment	20 – 40°C, non-condensing		
Sound Level	68 decibels at 36" [91 cm] distance (at full power)		
Certifications	RoHS, CE Marked		

* For European customers, the appropriate power cord is added.
** When measured at 1 in [25 mm] distance with an ACCU-CAL™ 50-LED radiometer in flood mode

Figure 30. *BlueWave LED Flood* with PrimeCure™ Array– 385 nm Spectral Output

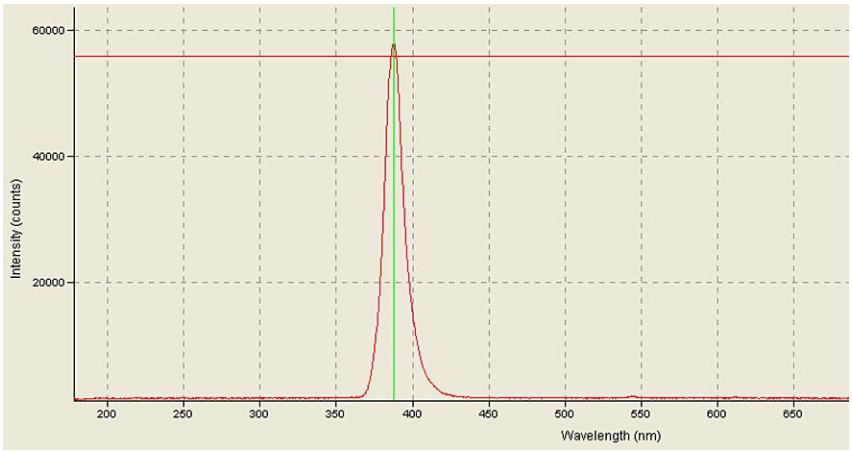


Figure 31. *BlueWave LED Flood* with VisiCure® Array – 405 nm Spectral Output

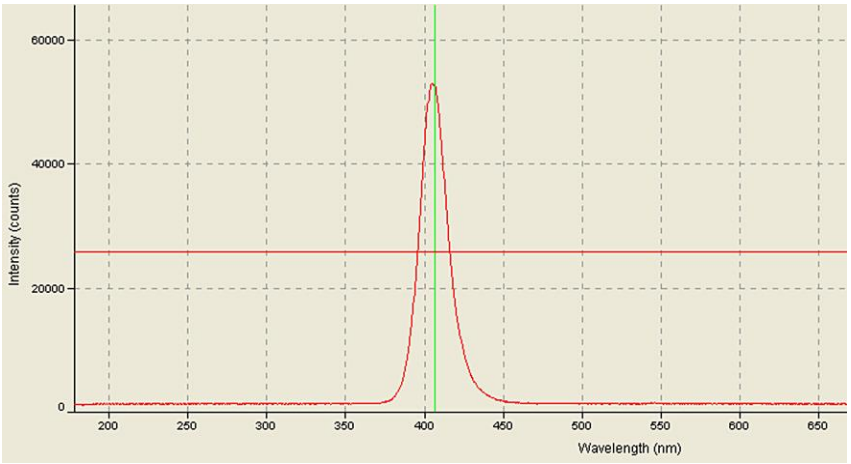
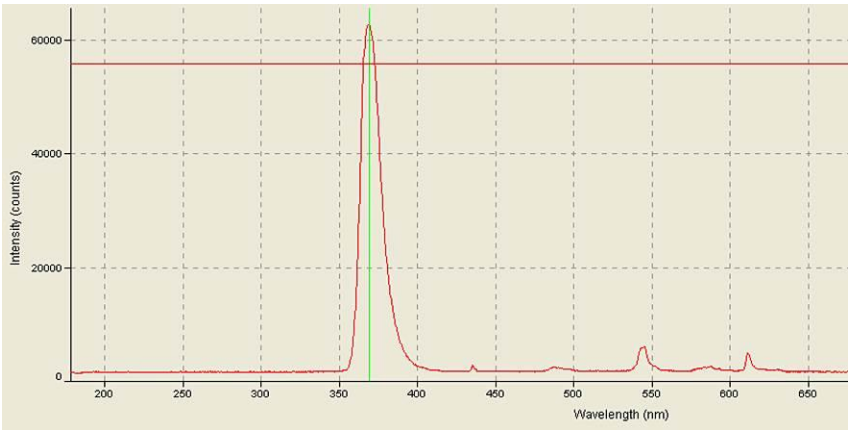


Figure 32. *BlueWave LED Flood* with RediCure™ Array – 365 nm Spectral Output



Warranty

From date of purchase, Dymax Corporation offers a one-year warranty against defects in material and workmanship on all system components with proof of purchase and purchase date. Unauthorized repair, modification, or improper use of equipment may void your warranty benefits. The use of aftermarket replacement parts not supplied or approved by Dymax Corporation, will void any effective warranties and may result in damage to the equipment.

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